DOCUMENT RESUME

ED 290 545 PS 017 090

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TITLE First Dialogues between Mother and Child: Differentiating Interactive Maternal Styles.
PUB DATE Jul 87
NOTE 31p.; Paper presented at the Biennial Meeting of the International Society for the Study of Behavioural Development (9th, Tokyo, Japan, July 12-16, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Communication Research; *Coordination; Foreign Countries; *Language Styles; *Mothers; Parent Influence; *Parent Role; *Toddlers; *Verbal Communication
IDENTIFIERS Conversation; *France

ABSTRACT

A study attempted to determine dimensions of maternal adaptation of language to the level of their young children's speech, and whether patterns of maternal adaptation can be described as interactive maternal styles. Links were sought between aspects of maternal language adaptation and child language level. Participating were 6 mother-child dyads in which children were between 21 and 28 months of age, and at the transition stage beween one- and two-word utterances. Mothers were either middle-level executives or professionals; spent a great deal of time with their children at home; and were native speakers of French. Each dyad was observed at home five times. A total of 29 conversations were recorded and transcribed. Analysis focused on the 5 minutes after the first minute of conversation. Each corpus of data was segmented into interactive episodes, speech turns, and utterances. Each utterance made by the child and by his or her mother was categorized on a coding grid as performing one of 22 functions, which were grouped into four main categories: (1) incitement or prompting, (2) feedback, (3) repetition of the partner's utterance, and (4) personal contributions of content. Overall findings seemed to support the hypothesis that mothers adjust the structure of their speech to fit the linguistic level of their children. (RH)

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FIRST DIALOGUES BETWEEN MOTHER AND CHILD: DIFFERENTIATING INTERACTIVE MATERNAL STYLES

Article based on the poster presented at the

IXth Biennial Meeting of the
International Society for the Study of Behavioral Development
July 12-16, 1987 Tokyo, Japan

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INTRODUCTION

Whether or not maternal language has an effect on the development of a child's language (the motherese hypothesis) is still a subject of lively debate (see in particular Gleitman, Newport, & Gleitman, 1984; Furrow & Nelson, 1986; Scarborough & Wyckoff, 1986). Relevant data is generally used to prove that relationships exist (or do not exist, depending on the point of view being defended) between the structural level of a child's language at time T2, and certain structural or functional characteristics of the language the mother adopts for her child at time T1 (generally, T2 - T1 = about 6 months). Maternal language is often said to be "adapted" to the linguistic level of the child. The relationships researchers are attempting to establish, expressed as correlations, imply the existence of inter-individual variations both between mothers and between children. Such variation only plays a role in statistical calculations on those relationships, and is not studied in itself. Moreover, the above research does not focus on the functional aspects of the language implemented, nor on the verbal interaction of mother and child as mother-child dialogues are in progress. These areas are dealt with in more detail by other researchers such as Lieven (1978), Martlew (1980), Moerk (1983, 1985, 1986), Rondal (1985a, 1985b), and Wells (1985). The existence of maternal conversation "styles" has thus been partially confirmed (McDonald & Pien, 1982; Olsen-Fulero, 1982).

The purpose of the present study is to find out whether we can determine the dimensions of such maternal adaptation, and whether the patterns defined by the values these dimensions take on can be described in terms of interactive maternal styles.

Finally, we will attempt to find out if there is any link between where a given mother stands along these dimensions and the current language level of her child.

EXPERIMENT CONDUCTED

Subjects. Six mother-child dyads were chosen as follows: after several lengthy visits to a day-care center, six children were selected on the basis of their age, remarks made by the day-care attendants, and their language ability, assessed in terms of MLU (mean length of utterance). Based on a recording made at the day-care center of a dialogue between each child and the experimenter, an MLU value was calculated for each child. The parents were then contacted to discuss the experiment. With their agreement, the remaining sessions were scheduled to take place in the home.

Insert table 1 about here

The 6 children chosen (2 boys and 4 girls) were between 21 and 28 months old, and were at the transition stage between one- and two-word utterances (MLU ranging from 1 to 1.5). Their mothers, who were either middle-level executives or professionals, spent a great deal of time with their children at home. Four of the children were first-borns (see table 1). The parents were native French speakers.

Procedure. Each dyad was observed at home five times, once every other week. At each session, the conversations between

the mother and the child were recorded for 15 to 20 minutes in a free interaction situation (free play, informal discussion, while looking at a picture book together). The experimenter sat as far away as possible from the dyad, observed its behavior, and handled the recording. During prior visits, the child had been familiarized with the situation and with the presence of a third person. 29 conversations were recorded in this manner (the AR child did not speak during the first session).

Analysis of the interactions. Once the conversations were transcribed, we analyzed the five minutes following the first minute, considered as the "getting going" part of the dialogue. Five minutes of conversation provided a sufficient number of utterances to conduct the various analyses planned (MLU, for example; see Rondal, 1985). Each corpus was segmented into interactive episodes whose boundaries were defined as points where one of the partners changed topics. These interactive episodes were then divided into speech turns, based on pauses and changes in speaker. Each turn was then divided into utterances (see figure 1), defined as speech sequences that were bounded by a pause or a clearly perceivable change in speech rate, and that performed only one function (see grid below).

Insert figure 1 about here

The segmentation into episodes, turns, and utterances was done separately by two different encoders, who segmented in the same way 97 to 99% of the time. The following indexes were defined to characterize the oral exchanges that occurred in each session: language complexity, which included the child's MLU, the mother's MLU, and the difference between the two; the number of turns speaking (NT) and the average number of utterances per turn (NU/NT) for each speaker; and a "maternal dominance" index (ratio of the number of utterances made by the mother to the number made by the child).

Each utterance made by the child and by his mother was categorized on a coding grid as performing one of 22 functions. The coding grid used was derived from those proposed by Moerk (1985) and Rondal (1985), and grouped the functions into four main categories (cf. appendix 1): a) incitement or prompting (INCIT), which includes attention attractors (AA), questions (Q?), requests for verbalization or action (RV, RA), and simple self-repetitions (SRS), which appear to play a prompting role; (b) feedback (FBA), both positive (FBP) and negative (FBN); (c) repetition of the partner's utterance (REP), which includes simple repetitions (HRS), partial repetitions (HRp), repetitions with semantic extension (HRT), repetitions with syntactic expansion (HRP), and repetitions with insertion into a richer context (HRI); and (d) personal contributions of content (CON), including partial self-repetitions (SRp), extended self-repetitions (SRT), expanded self-repetitions (SRP), labels (LAB), extensions of a preceding utterance (EXT), and declaratives (DEC). In addition to these four main categories, three other categories were defined: exclamations (E!);

persistence (PER), or multiple repetitions of the same utterance during the same turn; incomprehensible utterances (INC), only made by children; and other, impossible to categorize utterances (OTH). Only 1.1% of the infantile utterances, and 1.4% of the maternal utterances were labelled as OTH.

The utterances were classified individually by two separate encoders, who attributed the same labels 98% of the time.

Subject to variation across studies, feedback and maternal repetition of the child's utterance seem to have a positive effect on language development. Prompting and contribution of information have a more ambiguous effect, which appears to depend on their relative frequency.

RESULTS AND DISCUSSION

Average appropriateness of maternal language. Overall results (taking all six dyads and all 5 sessions together) seem to support the hypothesis that mothers adjust the structure of their speech to fit the linguistic level of their children.

Insert figure 2 about here

Although we are only dealing here with a relatively short period of time, figure 2 still shows that the conventional parallelism between the MLU's of mother and toddler exists (cf. Rondal, 1985b, for example). The same is true for the distribution of speaking turns, and for the average number of utterances per turn (figures 3 and 4). We can see that as far as language complexity is concerned, these mothers usually stay at a more or less constant distance from the language complexity

of their children. This maternal adaptation follows the evolutions of the children's language in time, although the progression is not pronounced here (the increase in average complexity is only slight). Given that our study is very short (about 2 months), an only slight evolution is normal. The different sessions serve as repeated measurements of the same period, randomly marked by unidentifiable circumstantial factors.

Insert figures 3 & 4 about here

Does this same pattern occur if we consider each dyad individually? And what happens if we consider the functional aspects of the dyadic exchanges?

Variations across dyads and language structure. The mean difference observed between maternal MLU and infantile MLU is about 1.5 (cf. figure 2). For the individual dyads, however, this difference deviates considerably from 1.5. Figure 5 shows the distribution. Dyad CO almost always has a difference of less than 1 -- subject to circumstantial fluctuations, this mother keeps her language "close" to that of her child along this dimension.

Insert figure 5 about here

Four other dyads are located in the intermediate zone in this respect (differences around 1.5: CE, MA, CE, AR). The last dyad (CL) consistently shows a difference above 2, which

increases with the sessions. (A similar increase is also observed for AR). The CL dyad also always has a higher average number of utterances per speaking turn than the average of the other 5 dyads (2 to 3.6 vs. 1.3 to 2.2). These results may be linked to the evolution in the MLU of the individual children (figure 6): the curves obtained are practically the inverse of the curves in figure 5. The CO child has the highest value, and CL the lowest. The MLU values are higher here than they were 15 days earlier when the children were selected, most likely because of the change in partner (mother instead of experimenter), which only tends to magnify the initial differences. Now if we calculate the difference between average MLU on the first two sessions and average MLU on the last two sessions for each child, we obtain the following values: +.71 for CO, +.33 for CE, +.43 for LA, +.36 for MA, but -.25 for CL, and -.34 for AR. Due to the brevity of this study, these figures cannot be used as developmental diagnostics, but they reinforce the division of the children in our sample into three language levels, as follows: CL and AR; then CE, LA, and MA; and finally CO.

Insert figure 6 about here

Do these levels represent specific forms of interaction, or maternal "styles", for example?

Maternal differences in language style. As we have just seen, these mothers do not maintain the same language distance

between themselves and their children. All 5 sessions taken together, the difference in MLU ranges from .80 (CO) to 2.41 (CL; see table 2). Mothers also differ in how much they monopolize the conversation -- the average number of utterances per turn (NU/NT) varies between 1.50 (MA) and 2.73 (CL). Maternal dominance (the ratio between the number of utterances made respectively by the mother and the child) ranges from 1.32 (CE) to 2.90 (CL).

Insert table 2 about here

These differences, which concern the structural and dynamic aspects of the dialogues, do not appear to be linked to the volume of the utterances made by the mothers. They represent instead the adaptation mode chosen by the mother and its intensity. Thus, dyad CL is characterized by the relative lack of adaptation (significant difference between the two MLU's, maternal monopolization of the conversation). The other dyads favor one aspect or another: for example, CO has very low level of structural complexity, and dominance by the mother; LA has a low level of structural complexity, and balanced exchange. A functional analysis will provide further information on these adaptation modes.

For the reason already mentioned above (short interval of time between sessions), the data obtained will hereafter be analyzed for all five sessions taken together. Figure 7 shows the percentages obtained by each mother for each of the four main functional utterance categories (see detailed presentation in appendix 2). The categories that were not taken into account

(E!, PER, OTH, and INC) only amount to 3.7% of the total number of utterances.

Insert figure 7 about here

These results indicate a great degree of variation between mothers -- in all four categories, the percentages are twice as high for some mothers as for others (overall chi-square = 108.12, $p < .001$, $df = 15$).

This phenomenon is very marked for incitations: 2 mothers (MA and AR) prompt their children a great deal, usually with attention attractors (AA), direct questions (Q?), and requests for action (RA). They thus maintain constant control over their child's behavior, leaving him little room for initiative in speaking or acting. Others mothers use this type of utterance less frequently (INCIT), and in different patterns (few direct questions for CO, few attention attractors for LA, CL, and CE). However, the former two mothers use less feedback (FBA) than the others (9.7% and 8.1% vs. 16.4% to 25.4%), thus acknowledging their child's behavior less. On the whole, positive feedback is more frequent than negative feedback.

Similar variations, although less marked, are found for utterance repetitions (REP): one mother rarely uses them (5.3% for AR), three use them moderately often as compared to the others (7.8% to 8.5% for MA, CE, and CL), and two use them a great deal (11.1% and 13.4% for LA and CO). This finding is important even if the percentages are low in absolute value, since these percentages characterize the frequency with which the mothers take the children's utterances into account and

answer them, either in a more standard form (HRP), or by extending the initial information (HRT, HRI); partial repetitions (HRp) are basically inexistent. Even if we do not count simple hetero-repetitions, the differences are still as marked. We are indeed dealing here with variations in the extent to which the mothers process their child's utterances, and not just with simple word-for-word repetitions.

Finally, content contributions (CON) make up between 26.3% and 38.8% of the utterances, depending on the mother. Those with the highest percentages (LA and CL) do not use the same types of contributions, however (for details, see appendix 2). For CL, information is mainly added through declaratives (D: 23%), while LA uses mostly extensions (EXT; 17.3%). In the former case, the child repeatedly receives a great deal of new information; in the latter, he receives explanations and semantic development, but of lesser quantity. The remaining 4 mothers differ little from each other, both in overall volume (26.3% to 35%) and in content. We also might mention the higher proportion of declaratives made by MA (19.4% out of a CON total of 35%).

Maternal language styles and child language development. In table 3, we have attempted to summarize the data obtained on maternal behavior. Three dimensions of maternal adaptation have been defined: structural adaptation of maternal language (its complexity), expressed in terms of difference in MLU; conversational adaptation, expressed by the extent of maternal dominance during oral exchange; and functional adaptation, based on the utterance categories used. Each dyad was characterized

along these three dimensions, either absolutely or relatively. For our sample, for example, CO demonstrates marked structural adaptation, moderate conversational adaptation, and positive functional adaptation (balance between incitation and contribution, a good deal of feedback and repetition). The "sum" of these three values gives us a rough idea of the impact maternal "style" might be expected to have on the language development of the child. The results correspond quite well to the order observed on the MLU's of the children (see table 3).

Insert table 3 about here

The same analyses were made on the utterances of the children. We cannot describe the results in detail here, although the correlations calculated between the characteristics of the mothers and those of the children provide some interesting information (see table 4). Keeping in mind that such correlations must be interpreted with caution (cf. Schwartz & Camarata, 1985), the following results might be mentioned: child MLU is negatively correlated to the mother-child MLU difference ($p < .05$) and to the number of maternal utterances per speaking turn ($p < .10$). On the other hand, child MLU is positively correlated to the percentage of maternal repetitions of the child's utterances ($p < .05$). Although non-significant, the correlations obtained between child MLU and the frequency of maternal use of the other three utterance categories indicate the expected tendency, i.e. a positive correlation to feedback ($r = .66$), a negative correlation to incitation ($-.35$), and a negative correlation to contribution ($-.49$), beyond a certain

threshold level.

Insert table 4 about here

A few of the other correlations observed between mother and child might be noted here: maternal feedback is positively correlated to infantile contribution, and negatively correlated to infantile repetition ($p < .05$ and $p < .02$). Maternal repetition is positively linked to incitation by the child ($p < .02$). The partners are thus interacting (in the social interaction sense, not in the statistical sense), so it is difficult here to speak of a one-directional influence (mother on child, or child on mother).

CONCLUSION

The phenomenon of adaptation of maternal language to infantile language is thus subject to a great deal of inter-individual variation, and can take on different forms. In addition to structural adaptation (MLU), which is aimed at adjusting utterance complexity to fit the child's current language level, there is also some type of conversational adaptation, which tends to balance the respective contributions of each of the speakers. Finally, the mother's speech may be adapted to varying degrees as to its functional effectiveness (type of utterances made). Dependencies between these three forms appear to be weak here, and they should perhaps be spoken of as complementary adaptations. We have yet to determine whether these complementary forms are cumulative, or whether one of them must attain a minimal level before the others can have

any effect.

The mothers studied differed greatly in these three forms of adaptation. The variations observed, however, form a continuum, and it is difficult to speak of specific styles. More empirical research is necessary before we can give a more precise definition of possible maternal styles. With this goal in mind, we are currently conducting a longitudinal study of three of the above dyads.

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Table 1. Characteristics of the dyads

DYAD	CHILD'S SEX	CHILD'S AGE	MLU	N of CHILDREN in CHILD's FAMILY
CO	F	24	1.50	3 (1)
LA	F	21	1.43	1
CL	F	21	1.26	1
CE	F	24	1.36	1
MA	M	28	1.28	2 (1)
AR	M	21	1.00	1

(Child's age given in months. Dyads are identified with two letters so that the child would remain anonymous. The number of children includes the child who participated in the experiment; the number in parentheses is the number of children older than the one studied.)

Table 2. Conversational characteristics of the mothers' language

Charact/ Dyad	CO	LA	CL	CE	MA	AR
Differences in MLU	.80	1.67	2.41	1.33	1.66	1.60
NU/NT Utterances per turn	1.77	1.51	2.73	1.83	1.50	2.08
Maternal Dominance	1.63	1.22	2.90	1.32	1.48	1.62
Number of utterances	402	278	409	355	443	210

Table 3. Maternal adaptation along the 3 dimensions defined

Dyad/Adaptation	Structural A.	Conversational A.	Functional A.	Effect
CO (2.36)	++	=	+	+++
LA (1.97)	=	+	+	++
CL (1.19)	—	—	=	———
CE (2.08)	=	=	+	++
MA (1.63)	=	=	-	-
AR (1.22)	=	=	--	--

(=: moderate adaptation as compared to the sample. + or -: adaptation above or below average. The numbers in parentheses following the dyad names are a reminder of the children's MLU's)

Tableau 4. Correlations between maternal and infantile characteristics

	DIFML	NU/NT	MN/CN	INCTC	FBAC	REPC	CONC	MLUC	INCTM	FBAM	REPM	CONM	MLUM
DIFML	1.00												
NU/NT	.70	1.00											
MN/CN	.65	.95	1.00										
INCTC	-.80	-.50	-.29	1.00									
FBAC	.07	-.04	-.02	.17	1.00								
REPC	.35	-.01	-.12	-.28	.27	1.00							
CONC	-.30	-.11	.08	.45	.21	-.85	1.00						
MLUC	-.82	-.74	-.58	.81	.23	-.50	.69	1.00					
INCTM	-.22	-.07	-.31	-.18	-.34	.47	-.79	-.35	1.00				
FBAM	-.25	-.24	-.10	.25	.14	-.83	.94	.66	-.75	1.00			
REPM	-.57	-.50	-.22	.89	.27	-.36	.66	.84	-.57	.51	1.00		
CONM	.87	.42	.50	-.48	.29	.37	-.10	-.49	-.52	-.07	-.13	1.00	
MLUM	.44	.05	.22	-.10	.48	-.17	.56	.16	-.92	.60	.35	.73	1.00

(dof: 4; .73: p<.10 .81: p<.05 .88: p<.02 .92: p<.01)

DIFML: difference between MLU of mother and child. NU/NT: average number of maternal utterances per turn. MN/CN: maternal dominance. INCTC: percentage of child incitations. INCTM: of maternal incitations. FBA, REP, CON: percentage of feed-backs, repetitions and contributions by the children (C) and by the mother (M). MLU: mean length of utterances made by children (C) and by others (M)..FF

Appendix 1. FUNCTIONAL CLASSIFICATION OF UTTERANCES

(These examples are loose translation of the french utterances)

1. **INCIT utterances:** incitation and prompting of the other person. They include:

AA: attention attractors ("look", "watch out").

Q?: direct questions ("Where are the cars?", "What are you doing?"). They do not include naming or labeling (cf. RV below).

RA: requests for action. These require motor action ("Mix it up first", "Put it on the top").

RV: requests for verbalization. These utterances request a verbal response of the naming type ("What is it?", "You tell me.").

SRS: simple self-repetition, or word-for-word repetitions of one's own utterance.

2. **FBA utterances:** Feedback, or return of evaluative information to the speaker. These utterances include:

FBP: positive feedback ("Yes", "OK", "That's right").

FBN: negative feedback ("No", "That's not the flour").

3. **REP utterances:** these are repetitions of what the other person said. They include:

HRS: Word-for-word repetition of the partner's preceding utterance (simple hetero-repetition).

HRP: Repetition with syntactic expansion (child: "A ha", mother: "It's a hat").

HRT: Repetition with semantic extension (child: "the same", mother: "They're alike").

HRI: Repetition with insertion into a richer context (child:

"a lil sheep", mother: "Where are the little sheep going?").

HRp: Word-for-word repetition, but only partial.

4. **CON utterances:** These include utterances in which the speaker himself adds information that is relatively independent of his partner's preceding utterances. They include:

SRT: Self-repetition with syntactic extension ("What turtle doing?" --> "What's the turtle doing?").

SRP: Self-repetition with semantic expansion (Do you want to put it on?" --> "Do you want to put your mask on?").

SRp: Word-for-word self-repetition, but only partial.

LAB: Labels designating an object or event the speaker can see ("That's tools", "That's lipstick").

DEC: Declarations stating a state of affairs, an event, an action. These are stand-alone, informative utterances ("Mommy made a boo-boo").

EXT: Extension of preceding utterances -- addition of new information, analogies, etc. ("That's the tape" -> "You see, it's turning").

The other categories, used so that classification of all utterances would be possible, do not fit into the preceding functional categories. They include: **E!:** exclamations ("Oh!", Hey!); **PER:** persisting, when a speaker repeats the same utterance several times in a row: **INC:** incomprehensible utterances, which the encoders could not understand, even with observation notes (only applies to children); and finally, **OTH:** other utterances, i.e. ones that do not fit into any of the above categories.

APPENDIX 2 - PERCENTAGE OF MATERNAL UTTERANCES IN EACH CATEGORY

1.INCIT-Type utterances

DYAD/ CAT.	AA	Q?	RA	RV	SRS	INCIT (total)
CO	11.4	6.7	10.9	5.2	1.5	35.7
LA	2.5	13.3	6.5	2.9	3.2	28.4
CL	7.8	13.0	5.4	2.7	1.2	30.1
CE	5.4	13.8	9.0	4.8	1.7	34.7
MA	15.8	13.3	10.0	4.5	1.1	44.7
AR	14.3	19.5	13.8	2.9	5.2	55.7

2. FBA-Type utterances

DYAD/ CAT.	FBP	FBN	FBA (Total)
CO	13.7	4.7	18.4
LA	13.3	6.5	19.8
CL	13.7	2.7	16.4
CE	17.2	8.2	25.4
MA	7.4	2.3	9.7
AR	4.3	3.8	8.1

3. REP-Type utterances

DYAD/ CAT.	HRP	HRT	HRI	HRS	HRp	REP (Total)
CO	7.5	.7	3.0	2.2	0.0	13.4
LA	4.0	1.4	3.2	2.5	0.0	11.1
CL	2.4	1.0	1.0	3.4	0.0	7.8
CE	1.7	.6	2.8	3.4	0.0	8.5
MA	2.9	.7	2.0	2.3	.5	8.4
AR	1.9	2.4	0.0	1.0	0.0	5.3

4. CON-Type utterances

DYAD/ CAT.	LAB	EXT	SRP	SRT	SRp	DEC	CON (Total)
CO	5.3	6.5	.5	2.0	0.0	13.9	26.3
LA	5.4	17.3	.7	1.0	.7	12.2	37.3
CL	6.8	8.3	.5	.2	0.0	23.0	39.8
CE	4.5	7.6	.8	2.5	0.0	14.0	29.4
MA	7.7	6.1	0.0	1.6	.2	19.4	35.0
AR	6.2	5.2	.5	1.9	.5	15.7	30.0

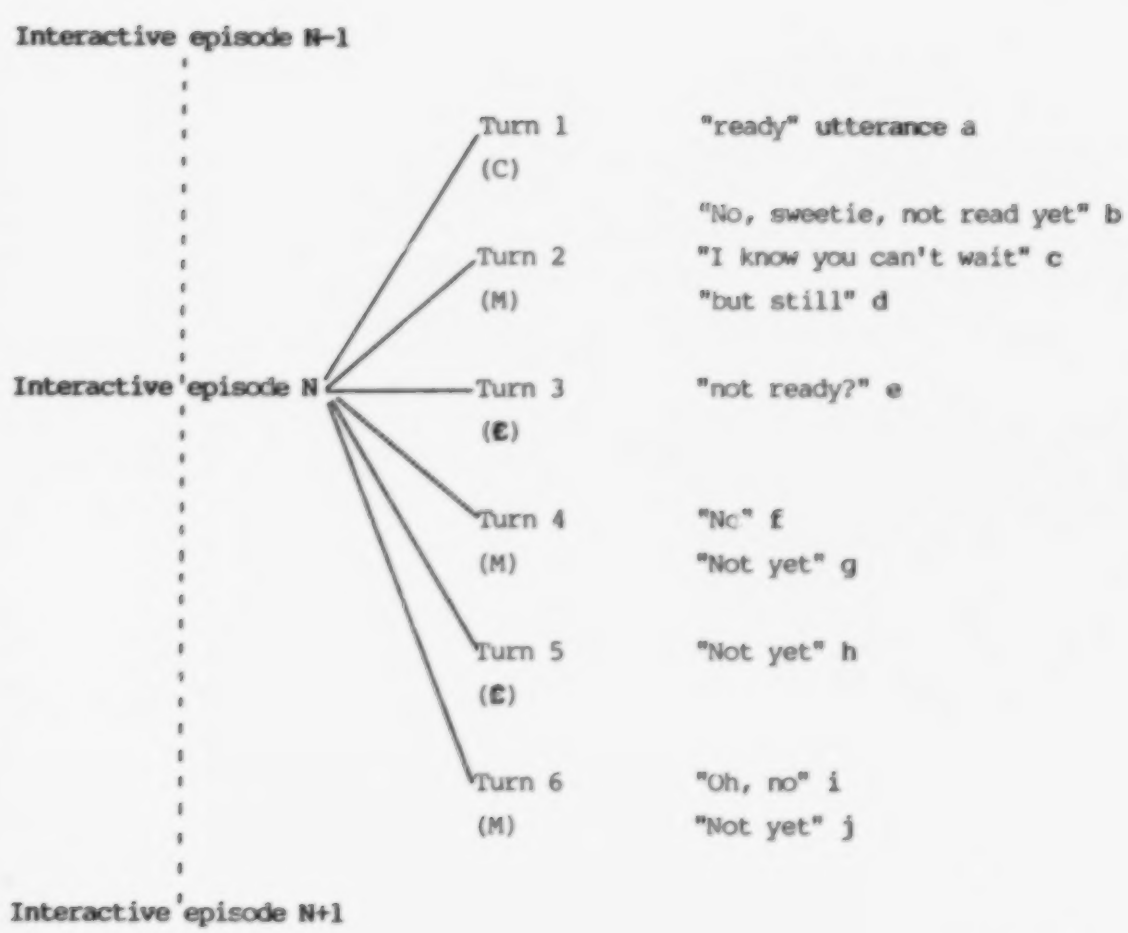

Figure 1. Corpus segmentation. An example of an interactive episode.

Figure 2. Average maternal and infantile MLU across sessions

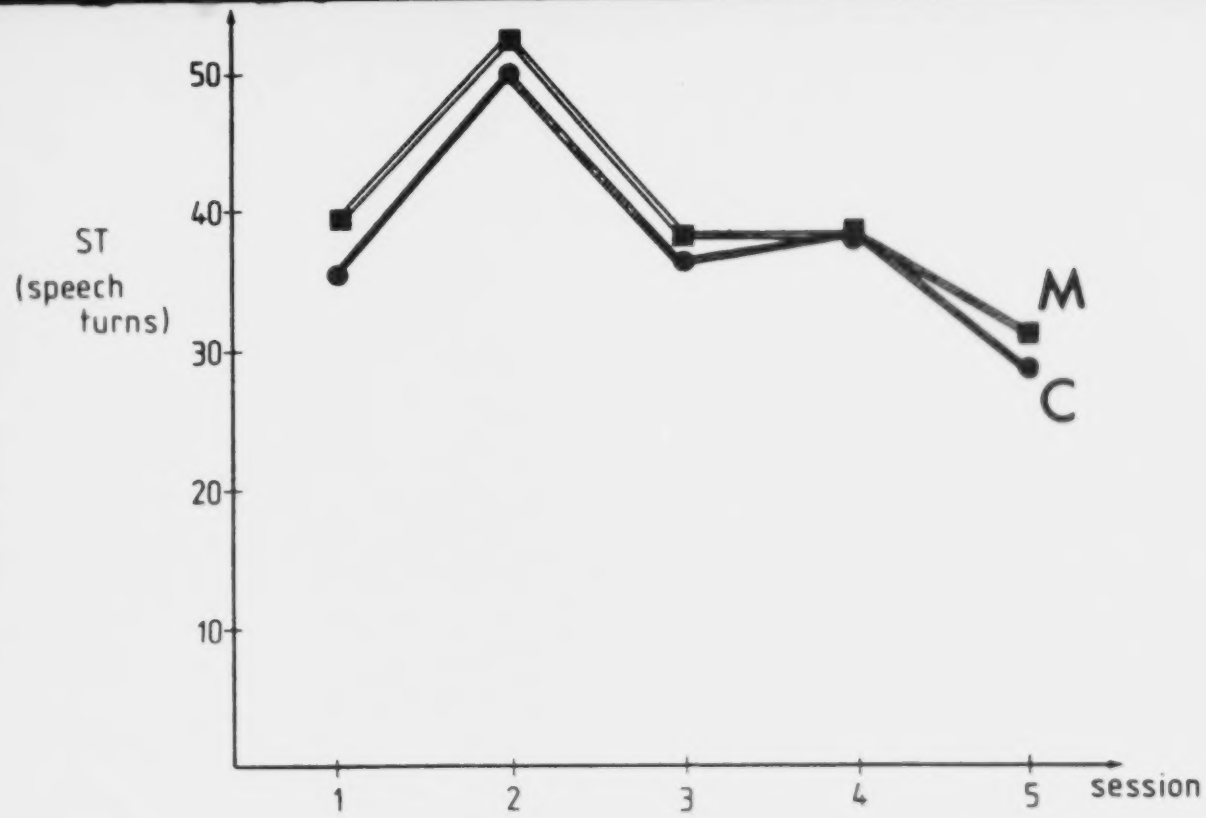

Figure 3. Average number of speech turns (mothers and children) across sessions

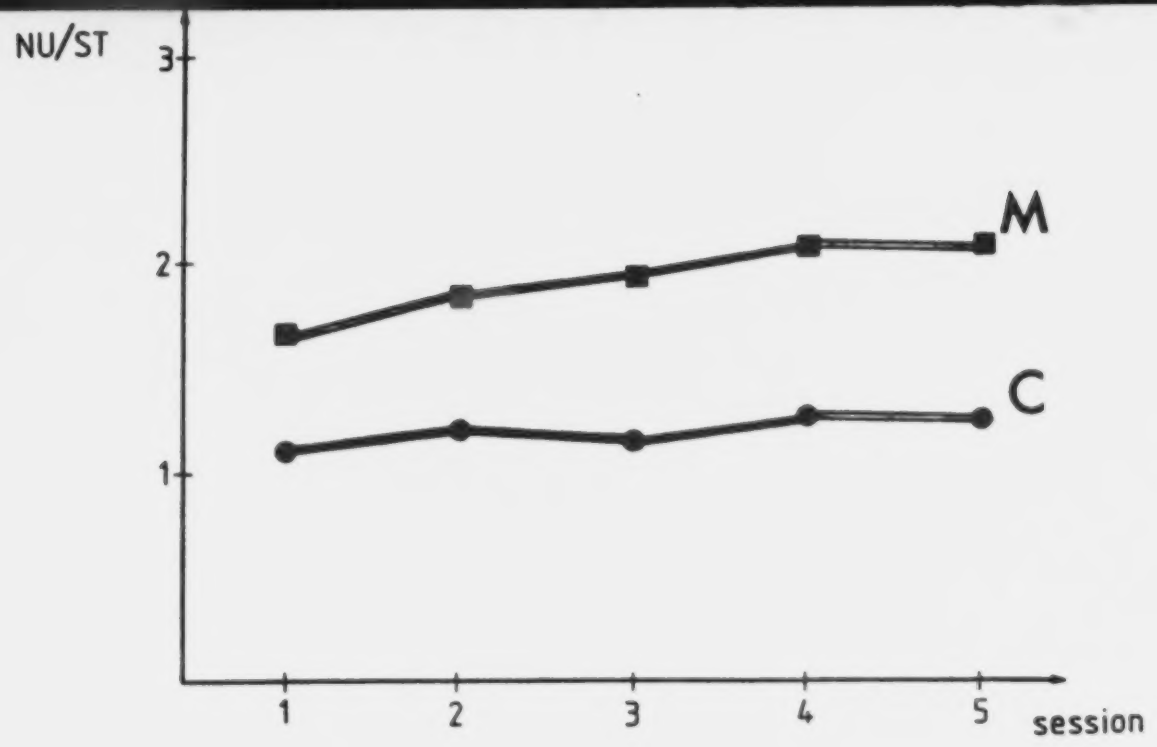

Figure 4. Number of utterances per speech turn (mothers and children) across sessions

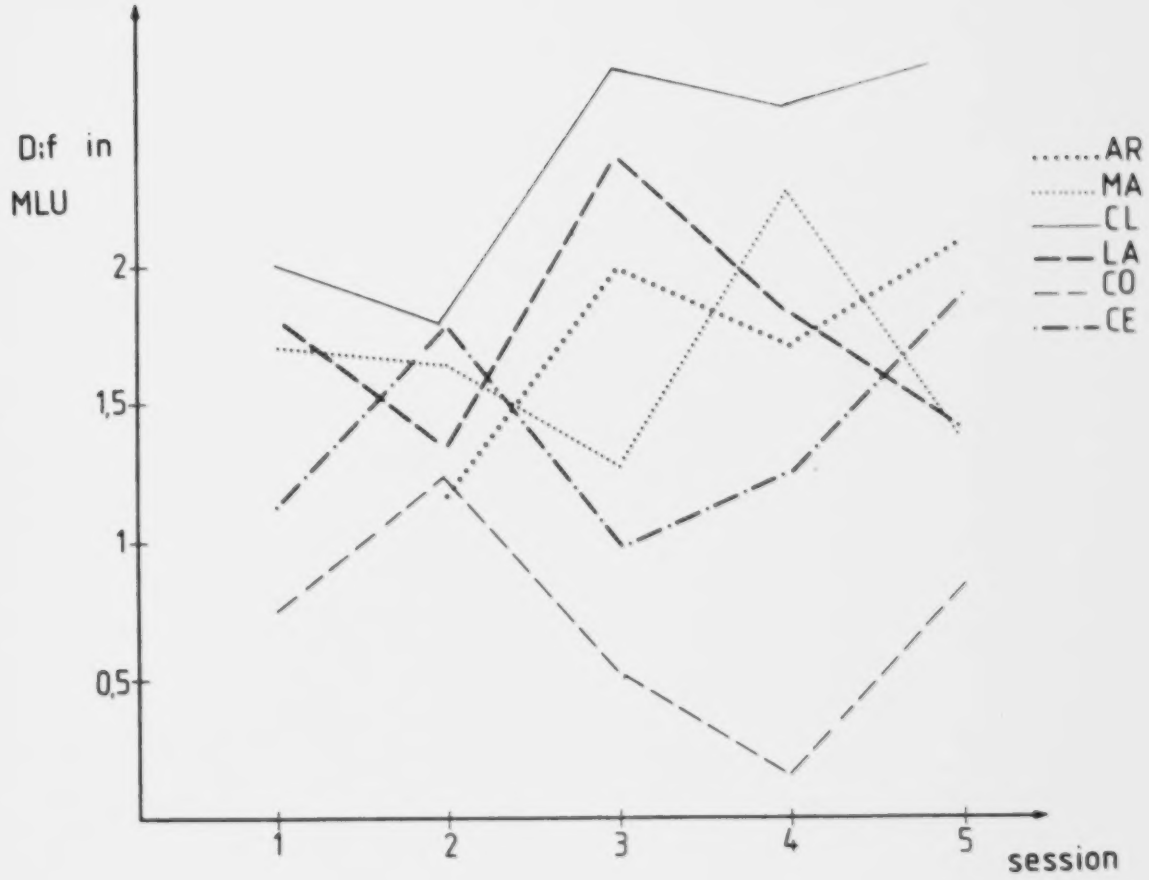

Figure 5. Variations in the difference between maternal MLU and infantile MLU, by dyad and across sessions

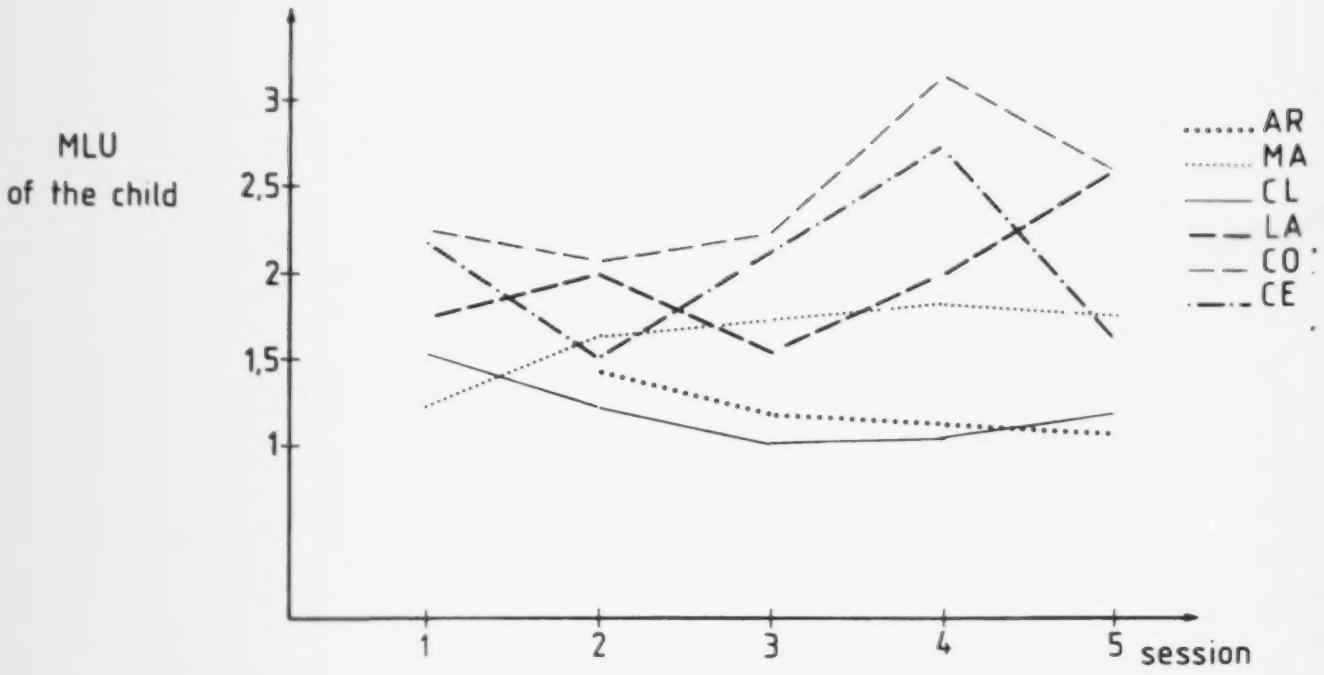

Figure 6. Evolution of individual child MLU across sessions

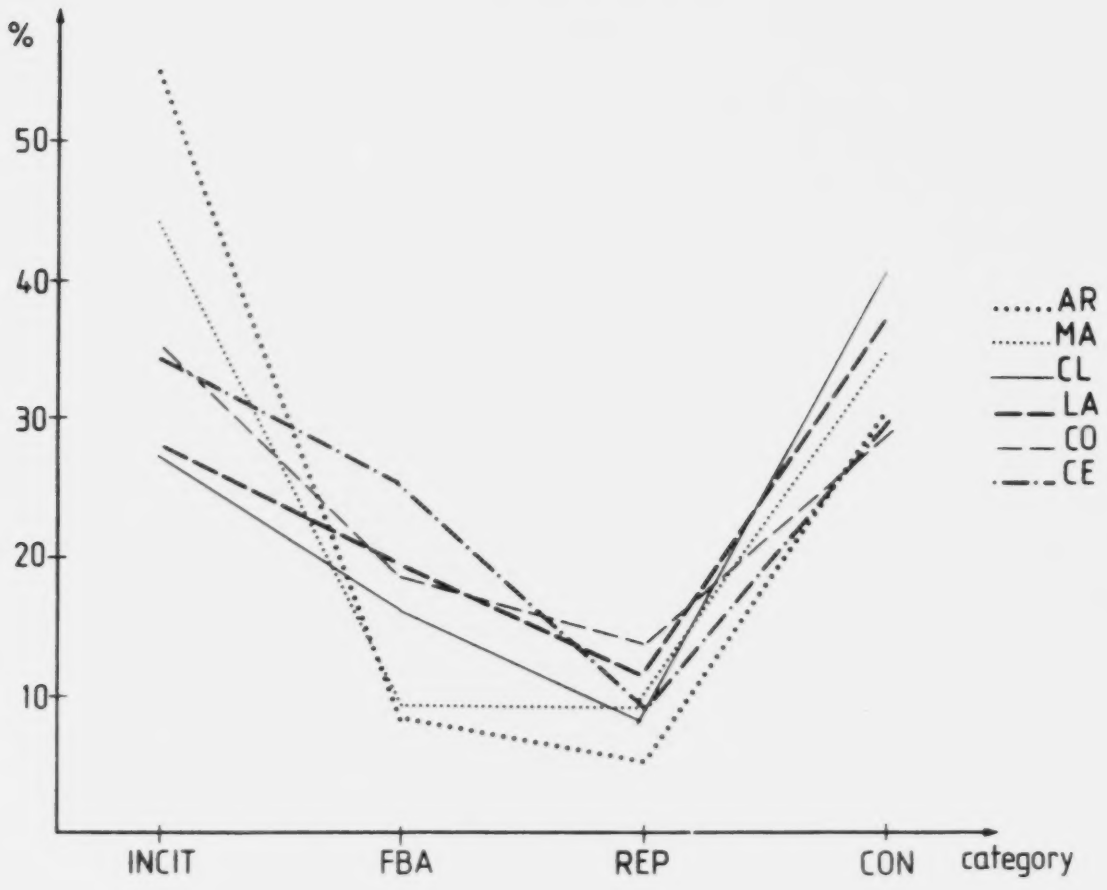

Figure 7. Percentage of utterances made by each mother in each of the 4 main functional categories